

ABSTRACT OF THE DISCLOSURE

A method for decoding a digital signal includes receiving a multiple-bit digital signal that includes information to be transmitted; arraying bit strings of the received multiple-bit digital signal to thereby generate a received signal image as a two-dimensional image; arraying all types of predetermined proper signals used for signals transmitted and bit strings of patterns including errors each derived from each proper signal to thereby generate a different two-dimensional image and disposing a set of received signal patterns, each comprised of an arbitrary proper signal and a group of two-dimensional images of patterns having the arbitrary proper signal added with an error, in a state that enables identification of each proper signal to thereby generate a received signal pattern image; using optical signal processing to evaluate a coefficient of correlation between the received signal image and the received signal pattern image to thereby obtain a correlation projection image in which depth and brightness intensity distribution is proportional to the coefficient of correlation; extrapolating transmitted proper signals from a region that includes a maximum point of the depth and brightness intensity distribution appearing in the correlation projection image based on a correspondence between the region and the set of received signal patterns in the received signal pattern image; and identifying transmitted information from the extrapolated proper signals.

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